hw 4-1 (pc 2.1, 2.2, 2.4) Attach a sheet if you need more space

Name ____________________________ Date __________ Period _______ Table _________

1. Find the distance between the given points \((-4, 10)\) and \((4, -5)\)

\[d = \sqrt{(-4 - (-5))^2 + (10 - (-5))^2} = \sqrt{1 + 25} = \sqrt{26} \]

\[d = 17\]

2. Solve for the indicated variable given the distance between the points.

b. \((1, 2)\) \((x, -10)\) \(distance = 13\)

\[13^2 = (1 - x)^2 + (2 - (-10))^2 \]

\[169 = (x - 1)^2 + 144\]

\[0 = x^2 + 2x - 24\]

\[0 = (x + 6)(x - 4)\]

\[x = -6\], \[x = 4\]

3. What quadrant of the coordinate plane is \(x < 0\) and \(y > 0\)?

2nd

4. Determine if points lie on the graph of \(x^2 + y - 4x^2 + 4y = 0\).

a. \((1, \frac{1}{2})\)

\[(1)^2 \left(\frac{1}{2}\right) - (0)^2 + 4 \left(y \frac{1}{2}\right) = 0\]

\[\frac{1}{2} - \frac{1}{4} + \frac{1}{2} = 0\]

\[0 = 0\]

\[yes\ solution\]

b. \((2, \frac{1}{2})\)

\[(2)^2 \left(\frac{1}{2}\right) - (0)^2 + 4 \left(y \frac{1}{2}\right) = 0\]

\[\frac{4}{2} - \frac{1}{4} + \frac{1}{2} = 0\]

\[0 = 0\]

\[yes\ solution\]

5. Find \(C\) such that the ordered pair \((2, 6)\) is a solution to the equation \(y = x^2 + C\).

\[6 = 2^2 + C\]

\[6 = 4 + C\]

\[C = 2\]

6. Find the \(x\) and \(y\) intercepts of the graph of \(y = x^2 + x - 2\).

\[(0, 2)\]

\(x\)-intercept

\((x + 2)(x - 1)\)

\((-2, 0) (1, 0)\)

\(y\)-intercept

7. Does \(x - y^2 = 0\) \(x\)-axis, \(y\)-axis or origin symmetry?

\[\frac{x - (-y)^2}{x - y^2} = 0\]

\[x - y^2 = 0\]

\[no\]

8. Sketch the graph of \(y = \sqrt{x - 3}\). Identify and intercepts and test for symmetry.

\[y = \sqrt{x - 3}\]

\(x\)-intercept \((-3, 3)\)

\[0 = x - 3\]

\[x = 3\]

\[x\]-intercept

\[no\]

\[y\]-intercept

\[no\]

9. Sketch the graph of \(x = y^2 - 1\). Identify and intercepts and test for symmetry.

\[0 = y^2 - 1\]

\[y = \pm 1\]

\((0, 1) (0, -1)\)

\(y\)-intercepts

\[x = 0 - 1\]

\[x = -1\]

\((-1, 0)\)

\(x\)-intercepts

\[x = y^2 - 1\]

\[no\]

\[y = \pm x\]

\[y\]-axis

\[no\]

\[x = \pm y\]

\[x\]-axis

\[no\]

\[y = \pm (x)^2 - 1\]

\[no\]

\[x = \pm (y)^2 - 1\]

\[no\]

\[x = \pm y^2 - 1\]

\[no\]

\[x = \pm y^2 - 1\]

\[no\]

\[y = \pm (x)^2 - 1\]

\[no\]

\[x = \pm y^2 - 1\]

\[no\]

\[y = \pm (x)^2 - 1\]

\[no\]

\[x = \pm y^2 - 1\]

\[no\]
10. Write the following equations for the circle in standard form and sketch their graphs.
   a. \( x^2 + y^2 - 2x + 6y + 6 = 0 \)
      \[ (x-1)^2 + (y+3)^2 = 4 \]
      \( C: (1, -3) \)
      \( r = 2 \)
   b. \( 16x^2 + 16y^2 + 16x + 40y - 7 = 0 \)
      \[ 16(x^2 + x + \frac{1}{16}) + 16(y^2 + \frac{5}{4}y + \frac{9}{16}) = 7 + 4 + 25 \]
      \[ 16(x + \frac{1}{2})^2 + 16(y + \frac{5}{4})^2 = 36 \]
      \( C: (-\frac{1}{2}, -\frac{5}{4}) \)
      \( r = \frac{3}{2} = 1.5 \)

11. Evaluate the functions for the indicated independent variable, and simplify the results.
   a. \( f(x) = 2x - 3 \)
      i. \( f(1) \)
         \[ f(1) = 2(1) - 3 = -1 \]
      ii. \( f(-3) \)
         \[ f(-3) = 2(-3) - 3 = -9 \]
      iii. \( f(x-1) \)
         \[ f(x-1) = 2(x-1) - 3 = 2x - 5 \]
      iv. \( f(\frac{1}{4}) \)
         \[ f(\frac{1}{4}) = 2(\frac{1}{4}) - 3 = \frac{1}{2} - 3 = -2 \frac{1}{2} \]
   b. \( f(k) = 3 - \sqrt{k} \)
      i. \( f(4) \)
         \[ f(4) = 3 - \sqrt{4} = 3 - 2 = 1 \]
      ii. \( f(100) \)
         \[ f(100) = 3 - \sqrt{100} = 3 - 10 = -7 \]
      iii. \( f(4x^2) = 3 - \sqrt{4x^2} \)
         \[ f(0.25) = 3 - 2|x| = 3 - 2(0.25) = 3 - 0.5 = 2.5 \]
      iv. \( f(0.25) \)
         \[ f(0.25) = 3 - \sqrt{0.25} = 3 - 0.5 = 2.5 \]
   c. \( f(x) = \frac{|x|}{x} \)
      i. \( f(2) \)
         \[ f(2) = \frac{|2|}{2} = 1 \]
      ii. \( f(-2) \)
         \[ f(-2) = \frac{|-2|}{2} = 1 \]
      iii. \( f(x^2) \)
         \[ f(x^2) = \frac{x^2}{x^2} = 1 \]
      iv. \( f(x-1) \)
         \[ f(x-1) = \frac{|x-1|}{x-1} \]

12. Find all real values of \( x \) such that \( f(x) = 0 \).
   a. \( y = x^2 - 9 \)
      \[ 0 = x^2 - 9 \]
      \[ x = \pm 3 \]
   b. \( y = \frac{3}{x-1} + \frac{4}{x-2} \)
      \[ 0 = \frac{3}{x-1} + \frac{4}{x-2} \]
      \[ - \frac{4}{x-2} = \frac{3}{x-1} \]
      \[ -7x = -10 \]
      \[ x = \frac{10}{7} \]

13. Find the domain of the functions.
   a. \( h(t) = \frac{4}{t} \)
      \( D: t \neq 4 \)
   b. \( f(x) = \sqrt{1 - x^2} \)
      \( D: -1 \leq x \leq 1 \)
      \[ [ -1, 1 ] \]

14. Find the \( y \) equations that determine \( y \) as a function of \( x \). (hint: solve for \( y \); determine if it's a function)
   a. \( x^2 - y^2 = 4 \)
      \[ y = \pm \sqrt{x^2 - 4} \]
      \[ \text{Not a function} \]
   b. \( 2x + 3y = 4 \)
      \[ 3y = -2x + 4 \]
      \[ y = -\frac{2}{3}x + \frac{4}{3} \]
      \[ \text{Yes, \( y \) is a function of} \ x \]
   c. \( x^2y - x^2 + 4y = 0 \)
      \[ y = \frac{x^2}{x^2 + 4} \]
      \[ \text{Yes, \( y \) is a function of} \ x \]